narcc Northern Amateur Relay Council of California, Inc.
p.o. box 60531 Sunnyvale, CA 94088-0531

March 16, 1995

Office of the Secretary
Federal Communications Commission
Washington, DC 20554



RE: ET Docket No. 94-32

Gentlemen:

Enclosed are an original and 9 copies of comments on the first Report and Order and second Notice of Proposed Rule Making. These comments are made on behalf of the Northern Amateur Relay Council of California, Inc., a voluntary association of over 250 owners of fixed and mobile relay stations in Northern and Central California.

We appreciate your consideration of our position and concerns on this important matter.

Yours, truly,

Carl Guastaferro
Director

CCG/cg

enclosures

**Before the**
**Federal Communications Commission**
**Washington, DC 20554**

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| In the Matter of | ) | |
| Allocation of Spectrum Below 5 GHz Transferred From Federal Government Use | ) | ET Docket No. 94-32 |



**COMMENTS OF**

**THE NORTHERN AMATEUR RELAY COUNCIL OF CALIFORNIA, INC.**

**IN RESPONSE TO THE FEDERAL COMMUNICATIONS COMMISSION**

**FIRST REPORT AND ORDER AND**

**SECOND NOTICE OF PROPOSED RULE MAKING**

**ET DOCKET NO 94-32**

by

*Its* Spectrum Director

Carl Guastaferro

March 16, 1995

**Before the**
**Federal Communications Commission**
**Washington, DC 20554**

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TO: The Commission

## Comments

## I. INTRODUCTION

1. The Northern Amateur Relay Council of California, Inc. (NARCC) is a voluntary association of over 250 owners of Amateur Radio Service fixed and mobile relay stations in Northern and Central California. NARCC grew out of the original California Amateur Relay Council. It was formed in the early 70's in response to the desires of repeater and remote base operators to mutually coordinate channel assignments.

2. NARCC is recognized as the official coordinator for all repeater sub-bands in our area for frequencies 28 MHz and above. Our Board of Directors hold monthly meetings, we publish a quarterly newsletter, our general membership meets semi-annually and we publish an annual directory of our repeater database. We along with our Southern California counterpart, SCRRBA, are active in the band planning process. Our database and current band plans are on file with the American Radio Relay League, Inc. (ARRL).

3. Our comments presented here concern the 2390-2400 and 2402-2417 band segments which have been elevated to primary status for use by the Amateur Radio Service. We are responding to your request for comment on interference levels and co-existence criteria with other services in these bands. We also would like to comment on the future status of the 2300-2310 band segment which is an important part of our band plan, both present and future.

## II. BACKGROUND

4. The Amateur Radio Service has been an important part of the 94-32 proposed spectrum reallocation. Before the first Report and Order, we were authorized to use the 2300-2310, 2390-2400 and 2400-2450 MHz band segments. We were secondary users to Government services in these bands. The Commission sought comment from all those entities who might benefit (or suffer) from a reallocation. Over the last year, through the NOI, NPRM and reply comment avenues, we and many other amateur groups have put forth our arguments as to why the above band segments were so important to us.

5. The Commission has seen fit to agree and has not only allowed us to stay in the bands but has elevated our status to primary in the 2390-2400 and 2402-2417 bands. For that, we are most grateful and NARCC would like to thank the Commission for that important decision. Many of our expansion plans were put on hold pending the outcome of the NPRM. We can now get on with the important migration of many services currently in the crowded UHF bands. The next challenge is "how do we co-exist with Part 15 devices and PCS stations without causing each other harmful interference?"

## III. DISCUSSION

6. In its Report and Order, the Commission has identified Part 15 Devices and unlicensed (low power) PCS users as those who are to share the 2390-2400 and 2402-2417 MHz bands with amateur operators. In order to determine the interference potentials, more information is needed about these devices or services. We have furnished the Commission with typical power levels, occupied bandwidths and receiver sensitivities of our present systems. The challenge results because of the continuous evolution of modulation techniques and the itinerant nature of the proposed services. Point-to-point systems can easily be identified and others can be coordinated in their area. However, couple those with mobile unlicensed devices and nothing can be predicted except chaos.

7. Part 15 devices do not pose a major threat to our operations. Their low power and wideband (possibly spread spectrum) modulation does not produce discrete, high level interference tones.

8. PCS operation, even with a power limitation, could spell big trouble. Theirs is an emerging technology and bound to promote fierce competition. Normally that is good for the user. However, the victor is likely to emerge as the one whose service is the most robust and reliable. That also could be the one which generates the most narrow band energy. It truly is too early to tell. A logical approach might be to allocate a portion of the bands in question for exclusive amateur and Part 15 use and exclude them from PCS. Another segment could be open to all 3 services with a "test bed" environment. PCS devices do not need another exclusive allocation. Their high powered cousins are destined to begin operation soon in the 1850-1990 MHz band.

9. Another subject worthy of comment is that of band plans, i.e. how we divide up the bands. As stated earlier, NARCC and SCRRBA, our southern California Counterpart, were in the process of modifying our band plans when news of Docket 94-32 surfaced. Now that we know our position in those segments covered by the Report and Order is secure, work can begin again in earnest. We need to accommodate several types of amateur uses:

a. Weak Signal (propagation experimentation)
b. Amateur Satellite
c. Point-to-Point Linking for voice and data
d. Amateur Television

These services are unique to each other and thus there is an opportunity to see how well each can co-exist with Part 15 and unlicensed PCS devices. There is work to do and that is the challenge for the amateur community.

10. How can interference be pinpointed? In our service, there is an activity called transmitter hunting. A low power transmitter is hidden in the field and it becomes a contest to see who finds it first. The techniques used can be adapted to work in the 2.4 GHz band. Of course the next issue that must be dealt with is what happens after an interfering transmitter has been located. If it is an unlicensed device, who is responsible?

11. We would also like to comment on our concerns about amateur satellite activity in the 2400-2410 and 2430-2438 bands. These are part of a world-wide allocation and it is very important to protect our operations. It has been suggested that a nominal field intensity due to Part 15 devices be permitted in these bands. At this point, we have no real way of evaluating whether levels in the 25-75 millivolts per meter area would cause problems with the Space-to-Earth activity. This is certainly the time to point out potential problems. If they turn out to be real, the Commission can deal with them at least with some prior knowledge.

12. To avoid potential receiver "desense" problems, we suggest a guard band be created on either side of the 2400-2410 MHz Space-to-Earth segment. This would afford a good degree of protection and keep the "noise floor" from rising near the band edges. The ideal case would be to exclude all other services from using this band. In lieu of that, a more stringent (lower) maximum field intensity standard for Part 15 devices operating in this band should be adopted.

13. NARCC would like to take this opportunity to comment on the future of the 2300-2310 MHz Band. We respect the Commission's stand that it not be part of this proceeding. The line had to be drawn as to how many band segments could be dealt with at one time. However, we want to reiterate our position that these frequencies are a vital part of our present and future plans. To consider removing them from amateur service would cause "excessive disruption" of our activities. The band is ideal to pair with the 2390-2400 MHz segment for point-to-point linking.

14. A comment on operation in non-contiguous bands. Several potential manufacturers of PCS equipment have said that to require a device to communicate in non-adjacent bands renders them either too expensive or lacking in performance (or both). This may be true in a case of a very

large frequency spread, such as trying to make a device work in both 2.4 GHz and 3.5 GHz. There are antenna matching, IF and possibly image problems. However, there are many commercial devices (both transmitters and receivers) which operate well over a band of frequencies which represent 20% of the center of the band. An example: television electronic news gathering microwave equipment covers the 2 band segments of 1990-2110 and 2450-2483 MHz with no compromise in performance. Current technology has even reduced the cost of the radios such that they sell for 50% less than narrow band equivalents of 5 years ago.

## IV. SUMMARY AND RECOMMENDATIONS

**15. To summarize, NARCC is very pleased that the Commission has granted the Amateur Radio Service primary status in the 2390-2400 and 2402-2417 MHz bands while allowing us to continue as secondary users elsewhere in the 13 centimeter band. We realize we have an obligation to help identify and resolve any interference problems which occur in shared bands. This always has been one of our prime directives.**

**16. We remain concerned about attempts by commercial entities to take spectrum away from us. However, based on the Commission's recent action, we are confident the important work we do has been and will continue to be recognized. We welcome the challenge of accommodating certain other users in our bands as long as a system can be put into place to resolve problems. Frequency coordination is based on what has been accomplished but with new modulation techniques and higher performance radios, we will be able to achieve more reliable communication in the future. However, we must have spectrum in which to experiment and grow.**

Respectfully submitted,

Carl Guastaferro
Spectrum Director
Northern Amateur Relay Council of California Inc.